LIM 503B | Professor McCaslin

Preservation of Video Games

Julian Della Puppa and Roberto Copado

Abstract

The purpose of this paper is to discuss the preservation of video games. The paper will explore the preservation of older video games and current ones. It will further discuss the problem of retaining metadata from video games do to ageing, becoming obsolete, or because of copyright. Current solutions to the preservation of video games are explained, so that readers can become familiar with the current efforts to preserve them. A solution is also suggested that can be used to better maintain the metadata of video games in the future.

Keywords: video games, metadata, preservation, preservation methods,

Introduction

Video games have grown to be a significant part of our culture. We can follow the history of video games back to 1958 with the creation of *Tennis for Two* and similar experiments done on analog computers (Brown, 2013) up to our current console generation and other games for computer gaming. What originally started as a simple exhibit for visitors would lead to an industry expected to have a revenue of $300 billion by the year 2025 (Tretkoff, 2008 & Koksal, 2019). Video games have grown to be a large industry in their short existence. However, in this short span of time there have been many types of video game software and hardware created. As time has passed not all games and hardware are still functional or playable. Like any other technology, video games are subject to ageing and becoming obsolete. In the same way we cannot play all games from the past there is no guarantee that we will be able to play all current games in the future. Why is this and what may be the reasons that prevent a video game from being playable in the future?

The Problem: Retaining the Metadata

Video games, whether they are old or new are difficult to maintain, and as a result of this it is possible that they will end up losing their ability to showcase how they used to be. The information that they contain, and how they behave as informational objects, will be lost if there is no effective way of being able to extract their metadata. However, there are varied reasons as to why retaining their information is difficult and especially so in their original state. These reasons include the fact that the games are suffering from software and hardware obsolesce, and that they may be facing licensing issues that prevent the information from being obtained.

The medium that games are created in is digital and one would assume that these digital items would last forever and would be able to be resilient to the passage of time. However, this is far from the case as "[v]ideo game [as] storage mediums deteriorate over time; this is true for all of the familiar computer hardware (like CD, DVD, SDD, HDD, etc.), as well as cartridges." (TRobinson, 2015) Video games suffer from what is known as "bit rot". PC Magazines online encyclopedia defines the term as "[b]it rot, also called 'format rot,' is the inability to access digital data because the file format is obsolete and compatible applications no longer exist to read it." (Bit rot, n.d.) Therefore, the challenge with being able to extract any information from older games that either were placed on formats like CD's or in cartridges becomes next to impossible to save because the formats are deteriorating.

In a modern context, video games are facing format obsolescence by way of their own video game companies. When looking at the games industry it should be understood that the "…games industry is essentially founded upon business models and discursive practices that effectively 'wear out' its past and present in order to sell the innovations and revolutions of the future." (Newman, 2012). This is further explained by Jason Scott an archivist for the Internet Archive at the Game Developers Conference in 2015 that video games have shortened half-life due to video game companies viewing their own product as obsolete and therefore removing them; Scott gives the example massively multiplayer online games generally being available for about one year and six months before their own servers could be removed. (Hall, 2015) Thus video games are uniquely challenged in the way of being able to obtain their metadata because no matter what format they will be in there is always the danger of them being lost unless there is action taken to ensure that the formats are secured, or that their information is saved in another way.

The other challenge to extracting and preserving the metadata in video games comes with the legal rights and ownership of the game. For archives and libraries to be able to hold on to the metadata of these information objects it would be imperative that they have the ability to actually be allowed to own the games. However, because these forms of media are a form of intellectual property and an entertainment property they are not necessarily seen as something that should just be given away to be preserved when they can be used to make money as a product. The aspect of the law that comes into play in ensuring that libraries, museums, and archives do not have the ability to access copies of games for the preservation of their metadata is laid down in the Digital Millennium Copyright Act (DMCA). This is because the DMCA gives the creators of games the ability to include anti-pirating software or Digital Rights Management (DRM) tools to be a part of the game, which can then limit access to anyone who owns a game but is not the original owner of the game. (McDonough et al, 2010) Furthermore, there are other legal issues elements that surround a game, basically each "…individual game has a slew of copyrightable elements, including design, underlying code, artwork, and sound…" (TRobinson, 2015) which means that libraries and archives would struggle as well to own versions of the game if, for example, they chose to emulate them as a preserving them. The rights holders could bring legal action against the libraries for having illegal copies of their games. The situation for video games when it comes to preserving and extracting their metadata is one of urgency that needs to be addressed as fast as possible because the elements of obsolesce, and legality are major hindrances for being able to obtain any kind of important information that would need to be preserved.

Current Solutions

While the issues described previously are an incredibly alarming threat to metadata, there have been methods put into place which have been taking an active role to combat the threat of losing the metadata. However it has been difficult to find solutions for this kind of preservation because of how new the medium is, but these methods have been proven to be the most effective for combating the metadata loss so that the information can be extracted and preserved while staying in its original state. By using the techniques of emulation, by working to change the laws, and by creating systems that can actively categorize the metadata, all together they are an effective approach to ensuring the metadata from video games is not lost.

Emulation "…is a digital process that aims at simulating either specific software applications or hardware architectures (or even both)…". (Carta, 2017) Thus there are programs that are created to enable the games to function when their specific hardware no longer exists, which as a result of this means that the games are still playable and have their information retained but some elements are unfortunately not able to be replicated such as the CD or cartridge. Furthermore, emulation is one of the more common ways of which games are preserved, however, there is one drawback to emulation, it can also suffer from format obsolescence since it is another digital format. (Winget, 2011) Also while it is positive that emulation is able to preserve a game in its original state, there is a factor of authenticity that could be lost since the original hardware is no longer available, and as result of this librarians, and information professionals will need to consider how sacrificing the true authenticity of game simply for emulation preservation is flaw that could be a future issue. (Carta, 2017)What emulation solves in terms of the loss in metadata is the fact that the game is able to still be playable and keep its authentic style and way of play, which means that it can be categorized and preserved.

The legality of who owns games, the rights that publishers have over games is an issue that is hindering the ability to actively preserve video games. The DMCA had restrictive guidelines in place for emulation and for the preservation of games because they want to protect video game companies from piracy. However, this law has changed due to petitions and other active political actions to allow for the preservation of video games. In the end, the DMCA now will allow some form of preservation by having libraries or museum obtain the original game code and server code for the game so that it can be preserved, however, while a large step like this has taken place there are still limits, as private citizens who want to emulate or preserve games still legally can not do so. (Birnnaum, Gault, 2018) What this means for video games is that there is now an ability for museums and libraries to be able to have copies of the games, which means that they are actually able to preserve them and save their metadata, and while this is not the largest step toward making preservation easier, it does give more leeway than before which can possibly lead to a more in-depth conversation with video game publishers and how important it is for them to allow for the preservation of their games.

There are systems in place that have been created that will allow for video game metadata to be preserved and this means that there are now actual structures that can save the metadata. While there are still those who are preserving it in their own way, as it was done prior to video games being taken more seriously in terms of them being preserved. The Library Of Congress has a system known as the Preservation Metadata Maintenance Activity (PREMIS), which "…is the international standard for metadata to support the preservation of digital objects and ensure their long-term usability." (PREMIS, n.d.) This means that there is a system in place that can be used to categorize digital objects such as video games and that by having this be created it signals a real move in taking the preservation of video game metadata seriously since it is being done by the Library Congress. Also included in this is PREMIS Data Dictionary which is a set of vocabulary and that can be used to determine the description of digital objects (Caplan, 2017)

Along with the Library Of Congress taking an active role in preserving video game metadata, the Internet Archive which began in 1996 has been preserving game metadata as well. As an open-source archive, they have been preserving all kinds of information from the internet and have an extensive video game archive that has mainly been collected by various means, but users tend to upload the information. (Internet Archive, n.d.) The system that they use to categorize the metadata is Dublin Core. (Managing and editing, 2019) According to the Dublin Core user guide it is described as a "…metadata standard is a simple, yet effective element set for describing a wide range of networked resources." (Hillman, 2005) As a system Dublin core can be used by any one and it was chosen by the Internet Archive because it is easy to use. These are two examples of systems that are aiding in the preservation of video games, are important to extraction and preservation of video game metadata because without them in place there would not be any kind of official structure that could house, and also classify the video game metadata. It would be without a true safe place, and because of the way the laws are aligned having places where the metadata can be stored makes it difficult for them to be removed.

Possible Solution

The current solutions are effective and are doing what they can to currently prevent the further loss of data from video games. However there are some other more direct and longer lasting ways for the data to be preserved. One of those ways is convincing developers and video game publishers to share their source code of a game so that it can be saved in an archive. By doing this code will be a part of the archive at an earlier state meaning an archive can start the preservation and extraction process before any kind of format loss can occur. This also means that the games will be in the care of specialists whose focus is on preservation. Freeing up the time of developers and publishers from maintaining their own archive and ensures that their works will forever be saved and immortalized as a part of gaming culture. On a smaller scale this has been happening with a few virtual and physical libraries such as the Video Game Archive at the University of Texas at Austin. (McDonough et al, 2010). Overall this sentiment to share the source code is not shared by the gaming community at large. These works are regarded as highly important and valuable by the developers. Thus there should be a greater amount of education for developers and more interaction from museums, archives, and libraries to show their own interest in gaming culture. By doing so developers can see museums and archives as stewards of the cultural impact caused by gaming.

Conclusion

In conclusion, the preservation of video games is not an easy task. There are many difficulties that must be faced when attempting to preserve them. These difficulties include format loss, obsolescence, and copyright. The threat of the loss of metadata will continue to be an ongoing challenge that must be solved. The current solutions of emulation, changes in legal copyright, and the creation of metadata preservation systems can only do so much. Which is why it would be beneficial for organizations focused on preservation and developers and publishers to cooperate by sharing the source code to video games. By doing so, there is an opportunity to better preserve the games that have grown to be such a large part of our current culture.

References

About the Internet Archive. (n.d.). Retrieved from https://archive.org/about/

Birnbaum, I., & Gault, M. (2018, October 25). Copyright law just got better for video game history. Retrieved February 14, 2020, from https://www.vice.com/en_us/article/zm9az5/copyright-law-just-got-better-for-video-game-history

Bit rot. (n.d.). *PC Mag*. retrieved from https://www.pcmag.com/encyclopedia/term/bit-rot

Brown, S. [Ahoy]. (2013, September 16). *A brief history of video games* [Video]. Youtube https://www.youtube.com/watch?v=GoyGlyrYb9c

Caplan, P. (2017, March). *Understanding PREMIS: an overview of the PREMIS Data Dictionary for preservation metadata*. [PDF file] Retrieved from https://www.loc.gov/standards/premis/understanding-premis-rev2017.pdf

Carta, G. (2017). Metadata and video games emulation: an effective bond to achieve authentic preservation?. *Records Management Journal*, *27*(2), pp. 192-204. https://doi.org/10.1108/RMJ-10-2016-0037

Hall, C. (2015). *The future of games history is workplace theft.* Polygon. Retrieved from http://www.polygon.com/2015/3/6/8158649/games-history-workplace-theft-internet-archive

Hillman, D. (2005). DCMI: Using Dublin Core. Retrieved February 14, 2020, from https://www.dublincore.org/specifications/dublin-core/usageguide/#introduction

Koksal, I. (2019, November 8). *Video gaming industry & its revenue shift*. Forbes. https://www.forbes.com/sites/ilkerkoksal/2019/11/08/video-gaming-industry--its-revenue-shift/#72e87e7663e5

Managing and editing your items - A basic guide. (2019). Retrieved February 14, 2020, from https://help.archive.org/hc/en-us/articles/360016403272-Managing-and-Editing-Your-Items-A-Basic-Guide-

McDonough, J, Olendorf, R, Kirschenbaum, M, Kraus, K, Reside, D, Donahue, R, Phelps, A, Egert, C, Lowood, H, Rojo, S. (2010). *Preserving Virtual Worlds Final Report.* Available via the University of Illinois IDEALS: https://www.ideals.illinois.edu/handle/2142/17097

Newman, J. (2013). *Illegal deposit: Game preservation and/as software piracy*. Convergence, 19(1), 45–61. https://doi.org/10.1177/1354856512456790

PREMIS: Preservation Metadata Maintenance Activity (Library of Congress). (n.d.). Retrieved February 14, 2020, from https://www.loc.gov/standards/premis/

Tretkoff, E. (2008). This month in physics history October 1958: Physicist invents first video game. *APS News*, *17*(9). Retrieved from https://www.aps.org/publications/apsnews/200810/physicshistory.cfm

TRobinson. (2015, October 24). *Video game preservation: Challenges*. [Online website post]. http://listheory.prattsils.org/video-game-preservation-challenges/

Winget, M. (2011). Videogame preservation and massively multiplayer online role-playing games: A review of the literature. *Journal of the American Society for Information Science and Technology*, *62*(10), 1869–1883. https://doi.org/10.1002/asi.21530